# JST Symposium on "Micro and Trace X-ray Analysis"
# Osaka City University Media Center
# 12-14, February, 2009

Scope:

X-ray analysis has been used for various fields, such as fundamental sciences, industry, medical applications, environmental research, etc. X-ray fluorescence (XRF), micro-XRF (M-XRF), total reflection XRF (TXRF), x-ray diffraction (XRD), micro-XRD (M-XRD), x-ray microscope (XRM) have been developed, studied and applied. Compared to conventional XRF and XRD, micro x-ray analysis, such as M-XRF, M-XRD and x-ray imaging techniques, give us more detailed information. Since mechanical and electrical properties of the materials are strongly related to elemental composition and atomic structure of the materials, it is very important to know 2D and 3D elemental distribution and structure of the materials. In particular, to know both elemental and structural atomic information, "x-ray chemical imaging" is promising technique. Thus, this JST international symposium will especially focus on "present progress and perspective on x-ray chemical imaging".

The XRS research at synchrotron radiation (SR) facility is very important for x-ray chemical imaging. SR-XRS research enables "nano" x-ray imaging, while the researchers in the laboratory usually analyze the micro region of the sample. It will very useful to know and discuss each other from different positions of SR-experiment and laboratory-experiment. Thus, it is one of the purposes of this symposium that the researchers at the SR and the laboratory meet together and exchange their ideas.

JST international symposium:

JST (Japan Science and Technology Agency) supports the progress of scientific researches. The organizer of this symposium (Kouichi Tsuji) had been supported by the research project of JST-PRESTO (Precursory Research for Embryonic Science and Technology) on "Development and research on 3D XRF instrument" from October 2004 to March 2008. Although this project finished in March 2008, JST kindly supports for successive progress of the project. This symposium is opened to show some research results of the project and discuss the future of this topic.

Key technology:

| | Laboratory | SR facility |
|---|---|---|
| Scanning mode | Polycapillary optics<br>Micro fine focus x-ray tube<br>Portable instrument | ZP<br>KB mirror<br>Precise stage controller |
| Projection, full field mode | X-ray CCD (film)<br>?? | ZP<br>X-ray CCD |

Date: 12-14 February 2009

Place: Media center, Osaka City University (OCU) http://www.osaka-cu.ac.jp/english/

Access: http://www.osaka-cu.ac.jp/english/info/access.html

## Hotel accommodation:

There are many hotels in Osaka city. Guest house in the campus of the university is also available, although the number of the rooms is limited.

## Registration for participants:

Registration fee is free. Please contact to Tsuji in advance.

## Contact:

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## Scientific program:

Oral and poster presentations will be arranged. This JST symposium will be jointed with the OCU annual symposium on “Development of Human Adaptive Materials”.

12 Feb. in the morning and afternoon; OCU annual symposium
in the evening; JST symposium (micro-XRS),
OCU-JST joint poster session and mixer
13 Feb. JST symposium (micro-XRS, imaging, TXRF), lunch and dinner
14 Feb. in the morning: JST symposium (SR-XRF, other topics)

**Thursday – February 12, 2009**

| | Time | Speaker | Title of presentation |
|---|---|---|---|
| | 9:45~15:40 | | OCU symposium |
| | 15:40~15:45 | Kouichi Tsuji | Introduction |
| 1-1 | 15:45~16:15 | Peter Wobrauschek | Micro XRF- sources, optics, detector, applications |
| 1-2 | 16:15~16:45 | Koen Janssens | XRF/XRD tomography and imaging at the micro- and nanoscale |
| 1-3 | 16:45~17:05 | Akiko Hokura | Study on accumulation mechanism of Cd in hyperaccumulating plants by X-ray spectrometry utilizing a high-energy synchrotron radiation X-ray microbeam |
| 1-4 | 17:05~17:25 | Kazuhiko Nakano | Reference materials (in film) for 3D-XRF analysis |
| | 17:30~ | Poster presentaton | |
| | 19:00~ | Mixer | |

**Friday – February 13, 2009**

| | Time | Speaker | Title of presentation |
|---|---|---|---|
| 2-1 | 9:30~10:00 | Alex von Bohlen | Near surface nanolayer and nanoparticle analysis using X-ray standing waves |
| 2-2 | 10:00~10:20 | Shuji Maeo | Development of micro focus X-ray tube with multi targets for the micro area analysis |
| 2-3 | 10:20~10:40 | Yoshiyuki Kataoka | A simple and rapid method for trace element analysis of liquid samples using a benchtop EDXRF spectrometer |
| | 10:40~11:00 | Coffee break | |
| 2-4 | 11:00~11:30 | George Havrilla | Chemical Analyses from Elemental Imaging |
| 2-5 | 11:30~11:50 | Chiya Numako | XAFS studies for evaluation of the barrier system in the geological disposal for radioactive wastes |
| 2-6 | 11:50~12:10 | Kouichi | X-ray fluorescence holography for visualization of |

| | | | |
|---|---|---|---|
| | | Hayashi | 3D atomic arrangement |
| 2-7 | 12:10~12:30 | Toshiro Sakae | Advanced X-ray imaging using parametric X-ray radiation(PXR) |
| | 12:30~14:00 | Lunch break | |
| 2-8 | 14:00~14:30 | Kenji Sakurai | Instruments for X-ray imaging without scans - Historical review and future outlook |
| 2-9 | 14:30~14:50 | Shinjiro Hayakawa | X-ray chemical imaging with laboratory and synchrotron light sources |
| 2-10 | 14:50~15:10 | Kouichi Tsuji | X-ray chemical imaging with scanning- and projection modes in the laboratory |
| | 15:10~15:30 | Coffee break | |
| 2-11 | 15:30~16:00 | Sultan B. Dabagov | Advances in capillary optics use for micro-XRF and X-ray imagings |
| 2-12 | 16:00~16:20 | Ning Gao | Latest developments of polycapillary optics and their applications |
| 2-13 | 16:20~16:40 | Hiroyoshi Soejima | Multi capillary X-ray lens MCX (poly capillary) and its applications |
| 2-14 | 16:40~17:00 | Kazuo Taniguchi | The present and future X-ray detector and related technologies |
| | 17:00~17:20 | Coffee break | |
| 2-15 | 17:20~17:40 | Jorge E. Fernandez | Selective amplification of X-rays in the energy range 30-70 keV |
| 2-16 | 17:40~18:00 | Hiroshi Kumagai | Novel oxide multilayer reflectors at "water-window" wavelengths fabricated by atomic layer epitaxy / atomic layer deposition |
| 2-17 | 18:00~18:20 | Atsushi Bando | X-ray imaging by using X-ray analytical microscope with mono-capillary |

**Saturday – February 14, 2009**

| | Time | Speaker | Title of presentation |
|---|---|---|---|
| 3-1 | 9:00~ 9:30 | Kazuto Yamauchi | Synchrotron-radiation-based hard-X-ray nanoprobe |
| 3-2 | 9:30~9:50 | Björn De Samber | Laboratory and synchrotron radiation micro and nano X-ray fluorescence: Instrumental developments and applications in life science |
| 3-3 | 9:50~10:10 | Yasushi Kagoshima | Phase-contrast hard X-ray microscopy with zone plate optical systems |
| | 10:10~10:20 | Coffee break | |
| | 10:20~10:30 | Kazumi matsushige | Memorial address |
| 3-4 | 10:30~11:00 | Christina Streli | TXRF using laboratory sources and Synchrotron radiation |
| | 11:00~11:10 | Coffee break | |
| 3-5 | 11:10~11:40 | Piero Pianetta | Full-field transmission X-ray microscopy for bio- and nano- imaging |
| 3-6 | 11:40~12:10 | Susumu Shimoyama | Bridging science and art -Discovery of black cat hidden in "Le jardin de Daubigny" (V. van Gogh) through element mapping image analysis- |
| 3-7 | 12:10~12:40 | Rene Van Grieken | XRS in the context of environmental analysis and preventive conservation of cultural heritage |
| | 12:40~12:50 | Kouichi Tsuji | Closing |

Poster presentation (core time: 17:30-19:00 12 Feb., also shown on 13 Feb.)

| | Presenter | Title of poster |
|---|---|---|
| P-1 | Björn De Samber | X-ray Fluorescence and Absorption Microtomography reveal Tissue Specific Distribution of Metals in Daphnia magna |
| P-2 | Kouichi Hayashi | Simultaneous acquisition of wave-dispersive X-ray spectra of several elements using strongly and accurately shaped Ge crystal |
| P-3 | Kenji Sakurai | In-situ XRF and XRD movie experiments |
| P-4 | Manabu Inagaki | Status of the imaging application at the PXR beamline of LEBRA |
| P-5 | Koichi Muraoka | Energy dispersive X-ray fluorescence analysis with multi-excitations |
| P-6 | Hisataka Takenaka | Development of MoSi2/Si multilayer Laue lens |
| P-7 | Seiya Kawamata | Fundamental research on sample preparation for TXRF analysis |
| P-8 | Shintaro Fukuoka | Grazing exit micro XRF analysis of layered reference materials |
| P-9 | Tasuku Yonehara | X-ray chemical imaging using polycapillary x-ray optics in the laboratory |
| P-10 | Kazuo Nakamachi | Micro X-ray beam produced by polycapillary x-ray lens and conical pinhole aperture |
| P-11 | Yoshihiko Nishida | Micro XRF analysis in the solutions by using needle-type X-ray collimators |
| P-12 | Toru Awane | Grazing exit micro XRF analysis of biological samples |
| P-13 | Tadashi Utaka | Sub-ppm analysis by XRF |